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Abstract: Irving Fisher's encounter with the Quantity Theory of Money began in the 1890s, during the debate about bimetallism, and reached its high point in 1911 with the publication of *The Purchasing Power of Money*. His most important refinement of the theory, derived from his recognition of bank deposits as means of exchange, was to treat their out of equilibrium recursive interaction with inflation as integral to it. This treatment underlay both his 1920s work on the business cycle as a "dance of the dollar" and his advocacy of subjecting monetary policy to a legislated price stability rule, initially to be based on his "compensated dollar" scheme. Fisher's failure to recognize the onset of the Great Depression even as it was happening was directly related to his faith in the quantity theory's seeming implication that price level stability in and of itself guaranteed the continuation of prosperity, while his subsequent work on the debt deflation theory of great depressions initially failed to repair the damage that this failure did to his reputation, and to that of the quantity theory. In the 1930s Fisher nevertheless remained an active supporter of various schemes to reflate and then stabilize the price level. His subsequent influence on the quantity theory based Monetarist counter-revolution that began in the 1950s lay, directly, in its deployment of his analysis of expected inflation on nominal interest rates, and, indirectly, in its espousal of the case for subjecting monetary policy to a legislated rule.

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"Currency is to the science of economy what the squaring of the circle is to geometry, or perpetual motion to mechanics" W. S. Jevons (1875)

Economic theories have lives of their own, just like economists, and one way of thinking about our subject's history is as a series of interactions among particular ideas and particular economists. The 1911 publication of *The Purchasing Power of Money*, whose centenary this conference celebrates, was a high-point in one such significant encounter, that between Irving Fisher, a great economic scientist with an extraordinary gift for simplifying complicated ideas, but also an enthusiastic – even obsessive - social and economic reformer, and the Quantity Theory of Money, an apparently straightforward positive explanation of the determination of price level, but often deployed over the years in normatively charged political debates about economic and social affairs. Evidently, Fisher and the quantity theory were well matched to one another.

The Protagonists

Fisher apparently knew himself well. In a 1924 letter to his wife, reprinted by William Barber et al (eds.) (1997, Vol. 13, pp. 1-2)), he remarked that "Perhaps I'm a Don Quixote but I'm trying to be a Paul Revere", and went on to speculate about his place in a pecking order that descended from "Christ, Socrates and Buddha" to "the social workers at Lowell House and the salvation army". Since Fisher's causes included world peace, eugenics, healthy living, and prohibition, such speculation was perhaps to be expected, but this letter's subject was another of his projects, stable money, in which he thought he had "found a niche in making application of my scientific training", that might enable him "to leave behind something more than a book on Index Numbers". This cause proved more durable than some of his others, and Fisher's work on its behalf contributed to a significant episode in the quantity theory of money's own long career, as this essay will argue.

Refined though it had become by the time Fisher took up with it, the modern quantity theory's roots in writings going back to sixteenth century Spain (see Marjorie Grice-Hutchinson, 1978) remained clearly visible, as they still would during its later

encounter with the monetarists, when Christopher Dow, no friend of the doctrine, would liken it to "a cat with nine times ninety lives, however many times discredited, never to die" (Dow, 1964, p. 308). As we shall see, Dow's simile is equally apt when applied to the quantity theory's life immediately before, during, and after its meeting with Fisher, who described his own version of it as follows:

> "The price level, then, is the result of . . . five great causes . . ., normally varying directly with the quantity of money (and with deposits which normally vary in unison with the quantity of money), provided that the velocities of circulation and the volume of trade remain unchanged, and that there be a given state of development of deposit banking. This is one of the chief propositions concerning the level of prices or its reciprocal, the purchasing power of money. It constitutes the so-called quantity theory of money. The qualifying adverb "normally" is inserted in the formulation in order to provide for the transitional periods or credit cycles" (1911, p. 320 [p.364])[1]

The Quantity Theory's Life before Fisher - Some Highlights

The quantity theory spent the first part of the 19th century as a component of Classical economics. Here it was an uncontroversial explanation of the behaviour of the price level under inconvertible paper money. Though Classical economics also occasionally attributed variations in the long run equilibrium value of the price level when money was convertible into specie to fluctuations in its quantity in circulation, it more typically focused on the precious metals' cost of production under such circumstances, while reserving the quantity theory for short-run analysis.[2] Arguably, the quantity theory's policy influence reached its high-point during the Classical period with the passage of the 1844 Bank Charter Act by the British Parliament. This measure, promoted and designed by the Currency School, sought to put beyond question the convertibility of paper money, and to eliminate financial crises, by giving the Bank of England a monopoly over the

[1] Here, and elsewhere wherever relevant, the second page reference enclosed in square brackets, is to the reprinted version of the work in the relevant volume of Barber et al. (eds.) (1997)

[2] David Hume's (1752) version of the doctrine is, of course, an early landmark in the Classical literature, with variations in the quantity in circulation of gold money, or paper money backed by gold, being invoked as the prime driver of the price level. Note that such words as "specie" and "precious metals" are here used in the text out of deference to the important and complicated role played by silver alongside gold in what was, down to the 1870s, an essentially bimetallic international monetary system.

issue of paper currency in England and requiring it to hold 100% specie reserves (on the margin) against its note issue.[3] This arrangement was supposed to make the quantity of notes in circulation automatically and immediately responsive to the balance of payments, and hence quickly to stabilize the price level to an extent sufficient to eliminate financial crises initiated by inflows followed by sudden outflows of the precious metals.

As is well known, though this Act remained in place until 1914, and did put convertibility beyond serious question, it failed abjectly to achieve its stabilization goal from the very start, in some measure because the version of the quantity theory underpinning it, unlike Fisher's of 1911, defined the money stock that influenced the price level as notes and coin alone, what we would now call currency. Hence the Act made no allowances for the growing importance in the monetary system of deposit banking in general, and of deposits transferable by cheque in particular, developments that themselves received a considerable boost from the phased elimination of the English commercial banks' private note issue that it decreed. In the wake of this conspicuous failure of a particular version of the quantity theory, Banking School ideas which, under gold convertibility, attributed a largely passive role to the quantity of money and relied on the Classical cost of production theory of value to explain the price level, came to dominate policy thinking for a while.[4]

But the quantity theory's mid-19th century demise was neither complete nor long-lasting. Even during the 1850s and '60s, shocks to the world's gold supply originating in California and Australia began to undermine the presumption, underlying much Classical thinking, that stability of the price of money in terms of gold also guaranteed stability of the price of goods in terms of money. Furthermore, the slow deflation that began in the 1870s, following the re-adoption of the gold standard by the United States after the Civil War, and its adoption by the newly founded German empire after its own foundation, as well as the consequent abandonment of bimetallism in France and elsewhere, drove this

[3] Thjs Act applied only to England. Parallel legislation extended its principles to Scotland, but preserved the issue of private bank notes there, albeit only when backed by 100 per cent reserves of Bank of England notes.

[4] The literature on this Act and the Banking School – Currency School debate that surrounded it is voluminous. For an excellent recent account of it, with ample references to earlier discussions, See Arie Arnon (2010) especially Part 3.

lesson home further. Along with these developments, which had been rendered all too visible by the simultaneous and rapid development of usable index numbers, the rise to dominance within economic theory of ideas about marginal utility made cost of production increasingly untenable as an explanation of the value of anything, including the precious metals, and therefore of the purchasing power of convertible money. In due course, then, and modified both in the light of its earlier failure and of the particular purposes to which it was now to be put, a revived quantity theory of money emerged to fill a developing intellectual vacuum that stretched from the very foundations of the theory of the price level to the practicalities of monetary policy.[5]

Fisher and the Quantity Theory Meet

Fisher's long association with the quantity theory began at precisely this juncture, specifically in the context of a highly politicized American monetary debate which would reach its climax in the presidential election of 1896.[6] The basic economic content of this "bimetallic controversy", as it is usually labeled, was straightforward. The quantity theory explained the slow deflation of the era as a consequence of the failure of the world's supply of gold to keep pace with its rapidly growing monetary uses; and to the extent that deflation seemed to require a policy response, the quantity theory also provided one, namely an increase in the rate of money growth. The bimetallists' specific proposal was to introduce (or re-introduce) silver alongside gold at a fixed relative price into a monetary system from which, in the case of the United States, it had been excluded by the Specie Resumption Act of 1873, a measure which would quickly be labeled a "crime" by its political opponents.

Bimetallism was an international movement, strongly represented in Britain among other places, but nowhere did it become as central to everyday politics as in the United States, where it appealed to diverse group of supporters made up, according to Francis A Walker (1897), of

[5] These developments, including the role played by the quantity theory in the debate about bimetallism, are discussed in Laidler (1991), especially Ch. 6.

[6] It was at just this juncture that gold discoveries in the Yukon and the introduction of the cyanide process which permitted an expansion of gold production in South Africa, led to an overall increase in money growth sufficiently large to replace deflation in gold standard countries with slow but steady inflation, thus undermining the case for bimetallism. This inflation persisted until the outbreak of World War 1 in 1914

". . .the inhabitants of silver producing states. . .silver coinage is with them not a financial but an industrial issue … those in favor of . . . depreciated silver because . . . it is the next best thing (by which they mean what we should call the next worst thing) to greenbacks . . what they really want is silver inflation . . . [and a] third element [who}believe that the [bimetallic] system will. . .avoid the evil of a restricted money supply; secure an approximate par of exchange between gold countries and silver countries, and promote stability in the value of money. ." (pp 217-219)

No less a later commentator than Milton Friedman (1992) has suggested that there was a good deal to be said in favour of this last position, but it was the inflationist agenda of western agricultural populism that took hold of William Jennings Bryan's presidential campaign of 1896, and the quantity theory of money's reputation certainly suffered from guilt by association with it, a fact of which Fisher would retrospectively make much in his Preface to *The Purchasing Power of Money.*[7]

". . .it has lost prestige and has even come to be regarded by many as an exploded fallacy. The attempts by promoters of unsound money to make improper use of the quantity theory – as in the first Bryan campaign- led many sound money men to [its] utter repudiation. . ." (1911 p.viii, [p. 21])

In the 1890s, Fisher himself had been a supporter of the monetary status quo, though his contributions to monetary economics at this time were well detached from mainstream contemporary arguments for sound money, which rested on, among other propositions, the idea that there was something inherently "natural" about prices set in terms of, and money made of or convertible into, gold, and the claim that the deflation of the 1870s and 80s had been due to technical progress that had reduced the costs of production of a wide range of individual goods. Fisher was already the author of a study of general equilibrium analysis (*Mathematical Investigations in the Theory of Value and Prices* 1892) that emphasized the importance of utility as the source of value and also showed, among other things, that a market system was one equation short of the number needed to determine the absolute, as opposed to relative, price of anything, so it is not surprising that he kept his distance here.

[7] On the political deployment of the quantity theory in these debates, See Laidler (2004)

Indeed, his most important monetary study of this period, *Appreciation and Interest* (1896) actually offered limited empirical support to contemporary critics of the gold standard. It addressed "the question of justice between debtor and creditor" (p. 1 [p.199]) that lay at the heart of the bimetallic debate, and enquired as to whether deflation had in fact redistributed wealth between these groups since the mid-1870s. Deploying (and acknowledging along with other forerunners) Alfred Marshall's (1887) distinction between real and nominal interest rates,[8] Fisher assembled a mass of empirical evidence to show that, in general, the behaviour of the latter seemed to reflect learning about deflation that was both slow and incomplete, so that, in particular, "During the last twenty years it has happened that the debtor is on the losing side" (p.80 [p.278]) But he also argued that the quantitative effect involved "does not seem capable of the deep social harm attributed to it" (p.81 [p.279]), and concluded that the adoption of bimetallism would do little to remedy it, but a great deal to create other problems. In a similar vein, his (1894) "Mechanics of Bimetallism", built on earlier analysis by Leon Walras (1886) among others, heavily qualified the view, still widely advanced in sound money circles at the time, that a bimetallic system was inherently prone to oscillate unstably between gold and silver monometallisms. Even so, Fisher explicitly refused to extend his theoretical results to assessing the "practical expediency of bimetallism" (p. 537, p.187]), let alone to supporting it

Obviously, these three studies all had close links to the quantity theory, but Fisher did not initially go out of his way to draw attention to them. It was only in the *Purchasing Power of Money* that he argued explicitly that the equation of exchange into which the quantity theory injected empirical substance was also the extra equation that the general equilibrium system needed to get from relative to money prices, that the "Fisher effect" as it came to be called, was involved in the mechanisms whereby the price level would move from one quantity theory determined equilibrium value to another, and that his account of the "mechanics of bimetallism" amounted to a specific application of the

[8] I single out Marshall here among these forerunners of Fisher because the "real - nominal" usage, adopted by Fisher and which we still use, was his. The Marshallian source that Fisher actually cited was the third (1895) edition of his *Principles of Economics.* It is not clear that he was aware of the 1887 paper at this time. He does, however cite it in (1914, p. 819 [p.576]). One of the many attractive features of Fisher's intellectual style was has fastidiousness in acknowledging the contributions made by others, a rather rare practice among his contemporaries.

quantity theory to a particular set of monetary arrangements.[9] Perhaps this was because, in the 1890s, Fisher was not yet fully aware of how integral to his work the quantity theory was already becoming, or perhaps it was because he was nervous about being publically associated with the dubious inflationist company it then was keeping. Either way, however, it is clear that his lengthy intellectual encounter with the theory in question had already begun.

The Purchasing Power of Money

There is an element of the reformer's exaggeration to Fisher's claim, made in the preface to the *Purchasing Power of Money*, that its role in the bimetallic controversy had so damaged its reputation that, "especially in America, the quantity theory needs to be re-introduced into general knowledge".(1911, p. viii [p.21]) In fact, even there, the theory in question had recently been the basis of, among other works, Walker's well balanced case for *International Bimetallism* (1897) and Edwin Kemmerer's (1909) study of *Money and Credit Instruments in their Relation to General Prices*, while in Europe versions of it had provided starting points for Alfred Marshall (1887) and Knut Wicksell (1898), and would soon perform similar services for Ralph Hawtrey (1913) and Arthur C. Pigou (1912, 1917); nor would it be hard to extend these lists. And there was nothing particularly novel in the mathematical economist Fisher's deployment of algebra in the theory's exposition in 1911. By then, as Thomas Humphrey (1984) has pointed out, quantity equations much like his (and/or Pigou's 1917) "had been largely or fully anticipated by at least 19 writers located in five countries over a span of 140 years", including, of course Simon Newcomb (1885) to whose memory Fisher actually dedicated the *Purchasing Power of Money*. [10]

. The quantity theory nevertheless still had many critics in 1911, and in America they were firmly in the ascendency when it came to the design of the legislation that would soon lead to the establishment of the Federal Reserve System. James.L..Laughlin of the University of Chicago, an exponent of Banking School ideas who had been

[9] The 1894 paper forms the basis of Chapter 7, Section 2, of the *Purchasing Power of Money*

[10] Pigou's article is the *locus classicus* of what came to be called the "Cambridge version" of the quantity theory, though it does not refer to the analysis it presents in these terms. It represents a self-conscious account on Pigou's part to stake Cambridge's (more specifically Marshall's) claim to have independently developed a theory of the price level strikingly similar to Fisher's. See Laidler (1991, Ch. 3)

bimetallism's and the quantity theory's leading American critic in the 1890s – See, e.g. Laughlin (1885), (1903) - not to mention a major butt of William H. Harvey's (1894) intellectually disreputable but extremely effective quantity theory related polemic *Coin's Financial School*, was excluded from direct participation here by his (Republican) political affiliations, but his former student Henry Parker Willis, who took the main responsibility for drafting the relevant legislation, shared Laughlin's views, as at this time did another of his former Chicago students, Wesley C. Mitchell, whose later research on business cycles would provide something of a foil for Fisher's work in the 1920s.[11]

In American discourse, then, the quantity theory was still on the defensive, and Fisher's (1911) systematic theoretical and empirically supported rehabilitation of it went beyond restoring its old life to opening up a new one for it. This happened not because Fisher presented any grand new version of the theory or insights into its workings that would have startled earlier adherents - he did not - but because his account of it was built around a few telling expository nuances, products of his theorist's gift for intellectual clarity. Prime examples here are provided by two features of the famous expression

$$MV + M'V' = PT$$

To begin with, in choosing the volume of transactions (T) as the relationship's scale variable Fisher gave an unambiguous emphasis in quantity theoretic analysis to the amount of "work" that money performs, and hence to money's role as a means of exchange. His Cambridge contemporaries, who created a supply and demand theory of the value of money, as often as not used the word "resources" to characterize the scale variable of their demand function. They thus created an awkward stock-flow ambiguity whose clarification by Keynes (1930) was a critical step in the evolution of liquidity preference theory, where the scale variable finally became the wealth constraint of a portfolio choice problem.[12] This latter theory, focusing as it did on money as a store of value, would for good or ill eventually lead the majority of monetary economists close to

[11] A penetrating account of the debates surrounding the creation of the Federal Reserve system, and Fisher's role in them, is given by Robert Dimand (2003b) , whose (2003a) paper on "Irving Fisher's Rejection of the so-called Business Cycle" also provides a thorough analysis of the interactions between Fisher's and Mitchell's treatment of this topic in the 1920s.

[12] Don Patinkin (1974) provides the classic discussion of these matters.

losing sight for a while of money's particular role in what Jevons (1875) had called *the mechanism of exchange.*[13] This could hardly happen in work that followed Fisher's lead.

Even so, Fisher's specific transactions velocity formulation of the theory proved too demanding of data to form the basis of much subsequent work, Carl Snyder's (e.g. 1924) efforts providing one major exception here. Its empirical implementation demanded that the economy-wide volume of transactions, including those in intermediate goods and financial assets, be measured, that an appropriate price index for this aggregate be constructed, and that the actual rate of turnover of money be measured too. The difficulties inherent here were all too visible in empirical sections of *The Purchasing Power of Money* itself, (see Laidler 1991, pp.79-82) as they were in Snyder's abovementioned work, and it is not surprising that, by the early 1920s, without drawing attention to its remoteness from what his own theory actually required, Fisher himself was habitually using a conventional wholesale price index in his quantitative work - see. e.g. (1923, 1925, 1926). Nor is it surprising that later scholars such as Lauchlin Currie (e.g. 1934) who followed Fisher in treating money's means of exchange role as primary from the theoretical point of view nevertheless based their empirical work on an income, rather than transactions velocity formulation of the quantity theory.

Fisher's same clear emphasis on money's a means of exchange role is also apparent in his explicit inclusion of chequable bank deposits (M') and their own velocity of circulation (V') alongside currency (M,) - which he usually called money - and its velocity (V) on his equation's left hand side. This is in sharp contrast to the usual Cambridge practice of the time of treating deposit banking as a factor affecting the velocity of currency and discussing its influence on prices in the usually verbal embellishments surrounding their algebra. Formally speaking, this difference is cosmetic, but before long monetary economists such as Currie (e.g.1934) and James Angell (e.g. 1936), would go a step beyond Fisher, constructing monetary aggregates by summing

[13] Recall that even formal models of the transactions demand for money in the spirit of William Baumol (1952) focused explicitly and carefully on the costs of converting "bonds" into "money" but modeled the role of the money in trade in goods and services in terms of a completely arbitrary and often barely articulated "cash-in-advance" rule.

currency in circulation and deposits, thus extending his approach to empirical work on the quantity theory along lines that have been followed ever since.[14]

The Dance of the Dollar

More immediately important for the quantity theory's life in the 1920s however, Fisher's placing of M' on its left hand side enabled, indeed required, the equation's scope to be extended beyond explaining the long term behaviour of the price level – its central role in the bimetallic controversy - to deal also with shorter term fluctuations, where causation quite evidently ran not just from deposits to prices but, through the workings of the banking system, in the reverse direction as well. His extension of the quantity theory to deal with these recursive interactions was the subject not only of the famous Chapter 4 of the *Purchasing Power of Money*, "Transition Periods" but of three subsequent papers, "The Business Cycle: Largely a 'Dance of the Dollar'" (1923), "Our Unstable Dollar and the So-Called Business-Cycle" (1925) and "A Statistical Relation between Unemployment and Price Changes" (1926). As with his exposition of the quantity theory itself, the novelty and importance of Fisher's contributions here stem more from particular matters of emphasis than from the broad outlines of his analytic story, which are closely related to Alfred Marshall's (e.g.1887) writings about the credit cycle.[15]

The basic mechanism deployed by both Fisher and Marshall, not to mention a number of Fisher's contemporaries - Ralph Hawtrey (1913) for example - relies on lags in the adjustment of nominal interest rates to variations in the rate of price inflation when the latter begins to respond to some initial shock, with this in turn affecting the profitability for producers of borrowing from the banks to expand output and therefore the rates of growth of bank lending and deposits. These monetary effects then influence the rate of inflation again, continuing a cumulative process that is reversed only when, for

[14] Note however that Currie, in keeping with his theoretical emphasis on money's means of exchange role, constructed a narrow (essentially M1) aggregate, whereas Angell included time deposits in his broader (essentially M2) aggregate. Friedman and Schwartz's (1970) *Monetary Statistics of the United States* is major source of information on the efforts to construct money supply series for the United States that preceded and formed the basis of their own work, which provided the quantitative basis for their (1963a) *Monetary History*

[15] Though in 1911 as in 1896, Fisher cited the *Principles*, albeit now the fifth (1907) edition, as his Marshallian source, rather than (1887).

some reason, nominal interest rates eventually catch up with and then overshoot the rate of inflation.

There is no need here to go into differences of detail among Fisher's specific version of these mechanisms and those of Hawtrey (1913, 1919) among others, which, in the current context, are of secondary importance.[16] What matters is Fisher's unique perspective on the place of these mechanisms in relation to the quantity theory of money. Others thought of them as constituting a monetary explanation of the credit or trade cycle, for whose analysis, as Hawtrey (1919, p. v)) would put it, "the quantity theory by itself is inadequate" because it was an equilibrium relationship applicable only when "the quantity of credit [i.e. deposits] and money [i.e. currency] in circulation is neither increasing nor decreasing" (p. 46)". For Fisher, on the other hand, they were the result of putting the quantity theory to work beyond its "normal" bounds on "transitional periods or credit cycles" - note that "or" rather than "and" is Fisher's chosen conjunction here - a broadening that required the recursive nature of the relationship between prices and bank money when the system was out of static equilibrium to be treated as integral to that theory.[17]

Following the routines associated with the neo-classical economic theory of his time, Fisher thus thought of what others called the cycle as an empirical manifestation of the stability experiment needed to supplement his monetary explanation of the price level's equilibrium value, not as an economic phenomenon in its own right, requiring an explanation which might or might not be monetary in nature. The catchy and much quoted title of his (1923) article signifies not merely that the business cycle is a monetary phenomenon, as for example Friedman and Schwartz (1963b) would have it, but rather that the cycle and the "dance of the dollar" are for all practical purposes one and the same thing. And Fisher's deployment of the phrase "So-Called Business-Cycle" in the title of his more elaborate (1925) account of these same matters carries the same message.

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[16] But not in all contexts: for a discussion of the relationship between Fisher's approach to the cycle and Hawtrey's from the broader standpoint of the development of neoclassical monetary economics, See Laidler (1991, Chs. 3 and 4). Hawtrey's analysis is notable for its original and penetrating treatment of systematic cyclical variations in reserve-deposit and currency-deposit ratios that anticipates later monetarist work on these matters, including that of Friedman and Schwartz, (1963b).

[17] On this matter, See Laidler (1999, pp. 184-185) In some of my other writings on Fisher and the cycle – e.g. 1991, 2004 – I have not made this distinction with the degree of clarity I now think it merits.

In the *Purchasing Power of Money*, the older term "credit cycle" is deployed. Its replacement by the phrase "business cycle" in Fisher's writings of the 1920s is surely a reaction to the development of a separate field of study under this label, and more specifically perhaps also to Wesley C. Mitchell's contributions to it (e.g. 1913, and also Mitchell et al. 1923). Though Fisher did not refer explicitly to these publications in the first two of the above-mentioned papers, he was, as Barber et al. (eds.) (Vol. 8., pp. 1 – 7) make clear, well aware of them and thoroughly out of sympathy with them too.[18] Mitchell's institutionalist approach to economics was not, as has sometimes been suggested, devoid of theory, but it was, as argued in Laidler (1999, pp. 200-201) eclectic and inductivist, and Mitchell had little patience for the deductivist general equilibrium economics that lay behind Fisher's work. Crucially in the current context, moreover, he presented the "business cycle" as very much a phenomenon in its own right, and indeed the complicated norm as far as the economy's actual behaviour was concerned: the very opposite, as he well understood – see Mitchell (1927) pp. 35, 465 - of Fisher's conception of it as no more than a symptom of an economy in transition between equilibrium price levels. As Robert Dimand (2003a, pp. 132-133) puts it, business cycle theory presented "a leading alternative in the 1920s to the monetary economics being advanced by Fisher", particularly in American discourse, and Fisher's work on cyclical fluctuations in the 1920s was in large measure a response to it.

Chapter 4 of the *Purchasing Power of Money*, where this interpretation of the cycle was first developed, paid essentially no attention to real variables, and Fisher's three later papers should be read as attempts to accommodate within his framework the fluctuations in these that so occupied Mitchell, an extension made all the more necessary by the fact that the extremely sharp contraction of the U.S. economy in 1920-21 had put them firmly onto the political agenda, The seriousness with which unemployment in particular was now taken is quite evident from the tone of Secretary of Commerce Herbert Hoover's "Foreword" to Mitchell et. al's (1923) volume *Business Cycles and*

[18] The third (1926) paper, does however refer explicitly to Mitchell et al (1923). See below. Note that, as Barber et al (2007, Vol, 4, p. 564) tell us, Mitchell reviewed the *Purchasing Power of Money* in 1912, criticizing Fisher for devoting only one chapter – that on transition periods, of course – to what in Mitchell's view was in fact the central feature of the economy's behaviour. Dimand (2003a) suggests that by confining his analysis of fluctuations to "transition periods" Fisher was also distancing his view of the quantity theory from the claims about long-run non-neutrality of money that had become associated with it during the bimetallic controversy

Unemployment, which begins as follows: "No waste is greater than unemployment; no suffering is keener or more fraught with despair than that due to inability by those who wish to work to get jobs" (p. vi)[19]

Fisher's (1926) "Statistical Relation between Unemployment and Price Changes" was in part an explicit response to this book, and it made yet another effort to debunk the idea of the cycle as a distinct phenomenon, a purpose that has been somewhat obscured by its having being reprinted as Fisher (1973) in the *Journal of Political Economy* and there portrayed as presenting an early discovery the Phillips Curve, which interpretation was then deployed by Milton Friedman (1975) as rhetorical cover for his own belated adoption of the New-classical "aggregate supply curve" version of the latter relationship.[20] In fact Fisher's paper had nothing to do with establishing or rebutting the idea of an inflation unemployment trade-off, and everything to do with substituting one already commonly used indicator of real economic activity that had also recently attained considerable policy significance – the unemployment rate – for another - a measure of the volume of trade - which he had deployed in his two previous efforts to give empirical support to his quantity-theoretic interpretation of economic fluctuations.[21] It is worth noting, furthermore, that the economic analysis it used to link price level movements to employment variations was startlingly old-fashioned for its time.

Compare Fisher (1926):

> ". . .when the price level is rising, a business man finds his receipts rising as fast, on the average, as this general rise of prices, but not his expenses, because his

[19] Hoover's longstanding commitment to the search for policies to counter fluctuations in employment, and his collaboration with the economics profession in the quest, is thoroughly documented by Barber (1985)

[20] In (1968) Friedman had criticized Phillips (1958) for erroneously confusing money and real wages. In (1975) he attributed a second error to Phillips, namely that of having causation run from unemployment to inflation instead of from inflation to unemployment, as had Fisher in (1926), this as a prelude to expounding an essentially Lucasian version of the expectations augmented Phillips curve. But note that Bordo and Rockoff (2011) advance a more charitable interpretation of Friedman's treatment of this (1926) paper . See below for further discussion of these issues.

[21] Before the development of aggregate output data, the behaviour of the unemployment rate over time was a commonly used indicator of cyclical fluctuations. See Pigou's (1926, 2nd ed 1929) *Industrial Fluctuations* for an example of the systematic application of this practice. Chart 106, p. 214 in this book, apart from using UK data, plotting employment rather than unemployment as does Fisher, and dispensing with distributed lags, is essentially the same as Fisher's (1926). In discussing his results, furthermore, Pigou notes that they "agree in a striking way with certain conclusions which Professor Irving Fisher has recently published for the United States" (p. 216) citing Fisher (1923 and 1925)

> expenses consist, to a large extent, of things which are contractually fixed, such as interest on bonds; or rent; . . .; or salaries; or wages. . .
>
> . . . when prices are falling, expenses likewise lag behind and reduce profits . . . bankruptcies are increased, concerns shut down entirely or in part, and men are thrown out of work." (p.49 [p.787])

with Marshall and Marshall (1879):

> "The connexion [sic] between a fall in prices and a suspension of industry requires to be further worked out . . .
>
> . . . when prices are rising, the rise in the price of the final commodity is generally more rapid than that in the price of the raw material, always more rapid than in the price of labour; and when prices are falling, the fall in the price of the finished commodity is generally more rapid than that in the price of the raw material, always more rapid than that in the price of labour" (pp. 155-156).

And recall also that the slowness of nominal interest rates to reflect inflation, the main factor that distinguishes these two passages, had also been broached by Marshall only eight years later, in (1887).

The originality or otherwise of Fisher's specific views on the causes of unemployment is not the main point here, however, because these views were secondary to his paper's principal purpose, which was provide empirical support to his theoretical interpretation of cyclical fluctuations as mere by-products of the quantity theory's out-of-equilibrium dynamics. Crucially, moreover, this theoretical viewpoint and the evidence adduced in its support implied, in Fisher's view, that price stability was the *sine qua non* of the economy's smooth and efficient functioning. His reforming zeal for "Stable Money", which received its fullest expression in his 1920 book *Stabilizing the Dollar*, was thus completely grounded in his own particular scientific understanding of the quantity theory of money's scope and significance.[22]

[22] It should be recalled, nevertheless, that, as already noted above, the price index that Fisher used in his empirical work in the 1920s was a wholesale commodity price index that bore little relationship to the transactions price level that the strict application of his version of the quantity theory would have required.

Stable Money in the 1920s

The monetary instability associated with World War 1 and its immediate aftermath, in Europe even more than in the United States, made "Stable Money" an attractive cause in the early 1920s. Even so, advocacy of its explicit pursuit did not begin with Fisher, nor was he by any means the first to deploy the quantity theory in this enterprise. His own later *History of the Movement* (Fisher with Hans Cohrssen, 1934) begins in ancient Greece and China, and points out that, in more recent times, price level stability had been the goal of - among many others, and as we have already noted above - quantity theorists such as the architects of the English Bank Charter Act of 1844 and the international bimetallists. Nor did either Fisher in particular or quantity theorists more generally have any monopoly over the stable money movement in the United States in the 1920s. Old fashioned sound money advocates, institutionalists and even under-consumptionists were also involved. Apart from Fisher himself, among those associated in one way or another with what was founded in 1921 as the *Stable Money League* and in 1925 became the *Stable Money Association*, and whose names are still readily recognizable, were Waddill Catchings, John R. Commons, William Foster, Edwin Kemmerer, Wesley C. Mitchell, Carl Snyder, Henry Parker Willis, Henry Wallace, Paul Warburg, and Allyn A Young (See, Fisher 1934, pp. 104 et. seq.)

Fisher was the intellectual driving force behind this episode in the movement's history nevertheless, particularly in its early years, and it seems to be to him that the literature of economics owes the idea of legally mandating the central bank to pursue a stable price level as its sole policy goal. His book *Stabilizing the Dollar* (1920) proposed nothing less than that Congress should pass "an Act to the Stabilize the Dollar", and included a "tentative draft" of such an act as the concluding Section 10 (pp.205-213 [pp.263-271]), of a lengthy Appendix (pp. 125-213 [pp.183-271] devoted to expounding the "Technical Details" of his proposals for monetary reform. The book thus made a case for subjecting monetary policy to legislated rules that not only set its goal – price-level stability - and specified how this was to be measured, but also laid out the means whereby it was to be achieved.

Curiously though, if only at first sight, and as earlier commentators such as Joseph Reeve (1943) and Don Patinkin (1993) have already pointed out, those means

sought not to harness directly the "five great causes" that Fisher's study of the quantity theory had convinced him determined the price level's behaviour, but rather to sidestep them. Fisher did not propose to control the behaviour of the money supply (or M and M' in his terminology) directly so as to offset the effects of variations in the volume of transactions and the velocity of circulation on the price level, but rather to adopt a variation on the gold exchange standard which he had already canvassed earlier under the label "the compensated dollar", in order to bring about such control indirectly.[23]

Specifically this scheme, whose origins, development, not to mention strengths and weaknesses, are thoroughly documented at this conference by Jerome de Boyer des Roches and Rebeca Gomez Betancourt (2011), required first the selection and regular computation of a suitable price index, and then the replacement of the legal requirement that the dollar be convertible on demand into a fixed amount of gold by one under which this amount would vary with the gold price of goods, as measured by the index in question, so as to render the dollar convertible at one remove into a fixed bundle of those goods. Obviously many detailed questions needed to be settled to make such a proposal operational, and the above-mentioned appendix to *Stabilizing the Dollar*, along with Fisher's work on index numbers - (1911) Ch. 10, but particularly *The Making of Index Numbers* (1922) mentioned in the 1924 letter to his wife quoted earlier - were intended to do just this. There is no need here to describe the details of these efforts, let alone pass judgment on their adequacy.[24] Suffice it to say that they were convincing enough to some of his contemporaries for his 1920 "Tentative Draft Act" to form the basis of the 1922 Goldsborough Bill for "Stabilizing the Purchasing Power of Money", which, though it

[23] The scheme was briefly discussed, though not under this label in Section 5, of the final chapter of the first (1911) edition of *Purchasing Power of Money.* The second (1913) edition of the book contains as an "Appendix . . .on 'Standardizing the Dollar'" - " an "extract from an address is Boston before the American Economic Association, December 1912, printed in the *American Economic Review Supplement*, March 1913 " (pp.494-502 [pp.538-546]) in which the phrase occurs on p. 495 [p539].

[24] As de Boyer des Roches and Gomez Betencourt (2011) show, the plan as Fisher originally formulated it had its difficulties, especially if it was to be implemented in an essentially closed economy context, to which he did not provide an analytic, let alone a practical, solution until 1920. As Michael Belongia has pointed out to me, Holbrook Working suggested as early as (1923, p. 248) that time lags in the effect of money on the price level were too long to permit Fisher's scheme to stabilize the price level within the period of the typical business cycle, and hence needed to be supplemented by active efforts to control the money supply along lines whose empirical basis Working's important and sadly neglected paper was largely devoted to establishing. Also, as Boianovsky (2011) notes, Wicksell, was an early admirer of the compensated dollar scheme, but began to lose faith in it under the influence of David Davidson's criticisms, published in Swedish in (1913).

failed in Committee in the House of Representatives, was the subject of hearings in which Fisher himself, among others participated.

That the compensated dollar was a variation on the already existing and therefore familiar gold exchange standard and could perhaps also form the basis of a stable international monetary order if other nations also adopted it, seemed to Fisher to be advantages when it came to convincing others of its feasibility and desirability. And, as Fisher well aware by (1914), various indexation schemes had also been in circulation for decades, for example those of Jevons (1875) Marshall (1887) and even an anticipation of Fisher's own by Aneurin Williams (1892), so the idea should have been familiar at least to informed observers. But Fisher's proposals to tamper with traditional monetary arrangements were nevertheless too much for many to bear. Williams's proposals had provoked an immediate and dismissive response from Sir Robert Giffen, under the title "Fancy Monetary Standards" (Giffen 1892), and Fisher was no better received in certain circles in the early 1920s. His Yale colleague, Thomas S. Adams gave him his only mention – in the company of Congressman Goldsborough and the 1922 Bill - in the entirety of Mitchell et al's (1923) *Business Cycles and Unemployment,* in the following terms.

> " These plans, Mr. Fisher's plan in particular . . .are impractical at this time, because people believe them impractical – if for no other reason. They propose to lay hands upon the economic holy-of-holies, and before they can be acted upon they will require an amount of critical discussion commensurate with that which should be given, say, to a proposal fundamentally to alter the marriage relation" (Mitchell et al (1923) p. 270)

. It is safe to say that Adams, his intellectual background as a Wisconsin institutionalist of roughly the same vintage as Commons and Young notwithstanding, did not understand the compensated dollar, and indeed, it is not quite clear that Congressman Goldsborough himself did either, for Adams quotes him as describing his Bill's purpose as being "to stabilize prices 'by controlling the quantity of money and credits in relation to the volume of trade by increasing or diminishing that quantity as the average price level goes down or up'" (Mitchell et al. (1923) p. 270), a summary of its intentions at

least as closely related to conventional quantity theory reasoning as to the compensated dollar *per se*..

Whatever the truth of this particular matter may be, however, it is certain that while attempts to legislate a price-level stability mandate for Federal Reserve System persisted throughout the 1920s and into the 30s, Fisher's compensated dollar scheme itself slowly moved into the background.[25] It gave way to variations on ideas about "credit control", similar to those evident in Goldsborough's remark, and more in the spirit of Ralph Hawtrey 's (1919) or John Maynard Keynes' (1923) work on monetary stabilization, or indeed that of Knut Wicksell (1898), whose analysis provided the basis for Gustav Cassel's (1928) discussion of these matters, which was, as Thomas Humphrey (2002) has suggested directly related to the U.S. debate. Indeed, as Allan Meltzer (2003, pp. 183-1992) recounts, even the phrase "stability in the price level" would be watered down to "a more stable purchasing power of the dollar" in the last such bill to be introduced before the onset of the Depression – the almost successful second (James) Strong Bill of 1928, whose principal academic promoters included Commons and Allyn Young - apparently because of fears among some potential supporters – notably Governor Benjamin Strong of the New York Fed -. that the public might find the idea of stabilizing the general price level, as opposed to specific prices, too difficult to grasp.[26]

Fisher's influence as a monetary reformer was thus already waning after the early 1920s, and, along with his efforts to enroll Benito Mussolini as a supporter (See Barber et al (eds.) 1997, Vol. 8, pp. 321-327) his main contribution to the stable money cause during the balance of the decade was his 1928 book *The Money Illusion*, which elaborately and even dramatically described the capacity of a price level instability to

[25] Boianovsky's (2011) suggestion that Fisher himself began to lose confidence in this specific scheme as the decade progressed is plausible, in the light of the accounts that both he and de Boyer des Roches and Betancourt Gomez (2011) give of the criticism to which it was subjected and the practical difficulties that implementing it would have entailed. Certainly, by 1932, though Fisher was still keeping the scheme, or at least its label, on the agenda, he was willing to entertain "A simple application of the compensated dollar plan" that would ".rely principally upon credit control, and only at long intervals regulate the weight of the dollar when other means proved inadequate." (1932, p. 139)

[26] It should nevertheless be noted than among those who did understand the proposal was Keynes, who in (1923, pp. 147-48) singled out for approval what it revealed about both Fisher's understanding that domestic price stability and exchange rate stability were sometimes in competition, and his willingness to give priority to the former. It should also be noted that Mitchell himself would take much more notice of Fisher in his (1927) *Business Cycles* with no fewer than 22 indexed references to his work. Dimand (2003a) discusses Mitchell's 1927 response to Fisher in some detail, but also notes that the amount of attention given to Fisher here was an anomaly in Mitchell's work.

undermine coherent decision making by ordinary economic agents. Fisher's faith in their capacity to see through the veil of money to the real economic signals that lay behind it, already heavily qualified in (1896) had by then diminished much further in the light of subsequent monetary history, and of his own personal experience in business.[27] Even so, it was not the complexity of Fisher's own specific ideas on monetary reform that would, at the end of the decade, decisively undermine his standing and that of the quantity theory as well. Rather, it was his very public misreading of the significance of the stock market crash of October 1929, and of the seriousness of the subsequent real downturn of 1930-32.

The Crash and the Depression

That Fisher misdiagnosed the behaviour of the stock market in the autumn of 1929 as nothing more than a bout of temporary instability is well known and requires little elaboration here. On October 23rd – the evening before the market broke in earnest - he told a meeting of the District of Columbia Bankers' Association that " . . . we are in a state of rapid transition, with great prosperity at present and greater prosperity in view in the future" and suggested that "these . . . rather than speculation, or these plus speculation, explain the high stock markets, and when it is finally rid of the lunatic fringe, the stock market will still never go back to 50 percent of its present level, what it was in 1926" (Fisher 1929, p.23 [p.25]). But, he added, presumably as a last minute amendment to his text, "I am surprised that it should have gone back as much . . . and . . .actually has touched those figures. I think it will rebound again" (p.24 [p.26]) [28]

In this same speech, Fisher attributed the past and future prosperity of the American economy on which his reading of the stock market rested to the systematic application of science to generating technical progress, the spread of scientific

[27] For a more detailed account of Fisher's own views on this matter, and how they changed over time, see Appendix 1, pp. 374-398, to *Stable Money*. . . (1934)

[28] The text of this, speech from which these quotations are taken, was printed for the first time in Barber et al. (eds) 2007, Vol. 10. pp. 3 – 26). It was far from unknown, however. John Kenneth Galbraith, presumably drawing on contemporary newspaper accounts, cited it in his widely read *The Great Crash.* See, Galbraith (1955, p. 103). Note that, as Galbraith (p. 151) also pointed out, Fisher was still elaborating on its optimistic arguments at the very end of the year, as he prepared his (1930) *The Stock Market Crash – and After*. This substantial (286 pages) monograph is now largely forgotten. Even Barber et al. (Vol 10, p. 31) reprint only the two paragraphs with which its final chapter "The Hopeful Outlook" ends.

management and its growing acceptance by the labour force, whose own productivity was also being enhanced by the beneficial effects of prohibition, and finally to "an immense impulse to prosperity through a stable price level, a more stable price level . . . than we ever had in half a dozen years in our lifetime, or in recorded history" (p. 10 [p.12]).And among these causes of prosperity and guarantees of its continuation ". . .next to invention, I should put stabilization of the dollar second on the list, and the most important" (p. 12 [p.14]). As he would note in (1932), reviewing the onset of the depression in late 1929 with benefit of hindsight: "One warning, however, failed to put in an appearance – *the commodity price level did not rise"* (p. 74 [p.134] Fisher's italics).

In 1932 Fisher found *ex post* rationalizations for this awkward fact of course, but crucial to the topic of this paper, it is clear than in 1929 it had deceived an observer who, since 1911, had repeatedly touted successful price level stabilization as virtually sufficient in itself to guarantee the continuation of overall prosperity. The quantity theory as he had come to understand it thus let Fisher down badly in late 1929, and the fact that he had relied so heavily on it in formulating his public position could not have done much for the quantity theory's reputation either. Nor in 1929 did Fisher simply take a public position. As the saying has it, his money – about $11 million of it - was also where his mouth was, and his continued faith in this implication of the quantity theory led to his financial ruin even as it also undermined the scientific reputation upon which his authority as a policy commentator rested.

Fisher's monograph *Booms and Depressions* (1932) was meant, in part at least, to repair that reputation, but it attracted little attention, perhaps just as well, given that it ended with a post-script dated September 1932 (p. 157-158 [p. 217-218]) proclaiming that "recovery seems to be in sight" (p. 157 [p. 217]); but he was nevertheless sufficiently anxious to establish the importance and originality of the "Debt Deflation Theory of Great Depressions" expounded in this book, and to publicize it further, that he took the opportunity presented by an invitation to contribute to the first issue of *Econometrica* to publish there a stand-alone summary of it (Fisher 1933b).[29] The theory in question followed his earlier work in focusing on price level instability as the source of

[29] A letter from Fisher, attached to an offprint of this paper located in my University's library, and reprinted in Appendix A below, testifies to his anxieties.

all other instability, but the downward spiral into depression that it described - running from debt-driven sales of goods through falling prices to rising real indebtedness and thence to further sales and price falls - went well beyond anything that could be characterized as an extension of the quantity theory. It was nevertheless an original creation and particularly in its stand-alone exposition, has by now long been recognized as such.[30]

Even so, in 1933 there was no novelty in the policy implications that Fisher's theory yielded: namely, that deflation had been destructive, reflation was urgently required, and once accomplished should be followed up by renewed efforts to put stable money into place. This basic message, and particularly its first two components, still had influential detractors in the United States to be sure – see for example, James L. Laughlin (1931), Henry Parker Willis (1932) and Gottfried von Haberler (1932) – but it also had a multitude of advocates other than Fisher, working on a bewildering and ever evolving variety of specific programs, and though Fisher would become an active supporter of many of these schemes, he originated none of them. The slippage in his innovative powers as a thinker and commentator on monetary policy issues that had already begun to be apparent in the mid-1920s thus became ever more evident in the 1930s even as the pace of his activities as an advocate seemed to accelerate

The following list of the monetary causes that Fisher embraced as the decade progressed is far from complete: in 1932 he participated in drafting and then signed the now famous Harris Conference Manifesto (See Quincy Wright (ed.) 1932) urging what came to be called fiscal inflationism on President Hoover; in (1933a) he advocated the issue of stamp scrip money, an idea implemented on a piecemeal basis in a number of localities during the depths of the depression, and owing its intellectual origins to the work of the unorthodox German economist Silvio Gesell, who would also attract a rather

[30] In particular it seems to have provided much of the early inspiration for Hyman Minsky's long but no longer neglected prophesies about the inherent instability of financial markets. See for example, Minsky (1963). Even so, Axel Leijonhufvud has told me, in personal correspondence, that in the early 1960s, when a doctoral student at Northwestern, he began to develop his own version of the debt-deflation theory for 18 months, discussing with, among others, James Tobin, William Fellner, Karl Brunner and Jack Hirschleifer, before anyone – David Meiselman then at the University of Chicago as it happens - alerted him to the existence of Fisher's earlier work. The Chicago connection here rings true, because Minsky impressed upon the present writer at just this time - he was my senior colleague at Berkeley between 1963 and 1965 - that Henry Simons had first inspired his own interest in such topics while he was an undergraduate student there.

more than passing mention from Keynes (1936, pp. 353-358); in (1934), he reiterated his earlier welcome (1933c) of President Roosevelt's revaluation of gold, a measure that surely owed more than a little to the compensated dollar idea, but was undertaken not on his advice, but mainly on that of the agricultural economist George F. Warren, and Fisher's own former student James Harvey Rogers; and he also found time to praise the by now well known (thanks to Lars Jonung 1979) Swedish experiment of pursuing price stability under fiat money by manipulating the central bank's discount rate; in 1935 he published *100% Money*, an exposition of what by then was being called "the Chicago Plan" (See Hart 1935), devised as he acknowledged by Henry Simons and his colleagues, for subjecting demand deposits in the US to a hundred percent reserve requirement, thus giving the Federal Reserve system complete control over the money supply, and hence, it was hoped, the price level too; and so on [31]

Given this frenetic activity, it was perhaps appropriate that Joseph Reeve devoted an entire chapter to Fisher in his (1943) study of *Monetary Reform Movements*, but the fact that the only other individuals to receive similar treatment were Father Charles Coughlin and Senator Elmer Thomas – both of them out and out monetary cranks – also speaks eloquently of Fisher's by then ambiguous standing. Though Reeve recognized that "In terms of both the ultimate effectiveness of his monetary crusades and of the caliber of his economic analysis, Professor Fisher presents a striking contrast to Father Coughlin and Senator Thomas" his ultimate verdict on him was nevertheless that "… with his genius for making difficult ideas appear simple, he over-simplified some of the fundamental problems" (p. 184)

The quantity theory, Fisher's preferred tool for simplifying monetary questions, for a while had a better time of it than he did. It provided, for example, the intellectual foundations of what Milton Friedman (1956) would later call the "Chicago Tradition", to which the Harris Foundation Manifesto of 1932 and the "Chicago Plan" for hundred per cent money already mentioned above were key contributions; and the fact that later work

[31] All of these activities, and more, are documented by Fisher himself in *Stable Money.* Scholars who rely on Barber et al.'s otherwise indispensable 14 volume edition of Fisher's Works should bear in mind that it finds space for less than a single page (Vol. 6, pp. 365-6) from this 452 page monograph. Note that Chicago economists were not the only originators of 100 per cent money proposals. Lauchlin Currie (1934) independently developed. his own version of the scheme, as his former undergraduate student Hart (1935) noted

has shown this tradition to have been nowhere near as unique to Chicago as Friedman initially suggested strengthens rather than weakens the quantity theory's claims to continued influence on the early 1930s.[32]

More versions of it than Fisher's were in American circulation by then, however. In particular, as noted earlier, Ralph Hawtrey's (1913, 1919) monetary theory of the cycle had started from its Cambridge version and in the later 1920s had exerted considerable influence on American discussions of "credit control" as a means of stabilizing the price level at the very time that Fisher's influence in the stable money campaign was beginning to wane. Hawtrey had also already canvassed "fiscal inflationism" as a means of coping with depression even in the 1920s – see e.g. Hawtrey (1925) - and the appearance of such ideas at Harvard, Chicago and elsewhere in the early 1930s probably owed more to this element in the quantity theory's complicated inter-war life than to its relationship with Fisher[33].

But we must not make too much of these matters here. If Fisher did not originate any of the projects associated with the quantity theory in the 1930s, he certainly supported and worked hard to publicize many of them. In particular, even though it makes no mention of Fisher, it is difficult to imagine that Henry Simons' still famous "Rules versus Authorities in Monetary Policy" (1936) could have been written if Fisher's work on behalf of stable money had not prepared so much of the intellectual ground for it. Even so, the quantity theory's influence on American economic thinking did not long outlast Fisher's. It came to an end, except in a few isolated instances – the work of Clark Warburton (see 1966) being a notable example - with the arrival on the scene in 1936 of Keynes's *General Theory,* and with a suddenness that confirms that it was already on its last legs. The most severe economic downturn in history had, after all, arrived without prior warning from the price level, and this serious empirical failing could not be

[32] Beginning with Don Patinkin (1969) Friedman's claims on behalf of the Chicago tradition generated a lengthy and sometime acrimonious debate. For a general account of the complex development of American monetary economics in the early 1930s, including a view of Chicago's place in it, see Laidler (1999) Ch. 9

[33] The term Fiscal Inflation may originate from its use as the title of Chapter 14 of Joseph Reeve (1943), a book based on a Ph.D thesis completed at Chicago in 1938, and which deserves more attention from historians of this period than it has received. Fiscal inflationism involves the deployment of deficit spending, not so much as a means of influencing aggregate demand in its own right, but as a means of creating government debt that can then be monetized for this purpose.

obscured by the quantity theory's subsequent usefulness as a source of insight into the dangers of falling prices and the likely benefits of reflation.

Furthermore, by 1936 an alternative way of understanding the significance of monetary phenomena for the workings of a market economy had already been developing for almost four decades. At first, this *Wicksell Connection*, as Axel Leijonhufvud (1981) would label it, had seemed to be another extension of the quantity theory, designed to incorporate phenomena associated with banking, roughly parallel to Fisher's.[34] But by the 1920s it was already apparent that it had the capacity to shift the focus of monetary economics away the influence of the quantity of money on the price level - and perhaps on real variables too by way of transitional side effects - to the influence of the rate of interest on saving and investment, and by that direct route on the level of real economic activity as well - though perhaps with side effects on the price level. When the Depression struck, this line of thought had not yet found an expression simple enough to command wide assent and hence replace the quantity theory in general discourse. In 1936, however, the *General Theory* gave it just that, and one of the quantity theory's more interesting lives came to an abrupt end.[35]

The Quantity Theory's Life after Fisher – Some Highlights

The Keynesian ascendency did not last for ever, of course, and the opening manifesto - Friedman ed. (1956) - of what Harry Johnson (1971) would call the Monetarist counter-revolution bore the name *Studies in the Quantity Theory of Money.* Since this volume's five empirical studies dealt with the influence of the quantity of money on the price level in various historical episodes, its title was entirely appropriate, but the model expounded in Friedman's opening essay as a "Restatement" of the quantity theory was firmly in a Cambridge, even Keynesian to some eyes (see Patinkin 1969, 1974), tradition, not a Fisherian one. Only one of the volume's contributors - Richard Selden in his "Monetary Velocity in the United States" - cited Fisher; nor was he mentioned at all in a subsequent Chicago collection of quantity theoretic studies, David Meiselman (1968), while his

[34] This indeed is exactly how Fisher himself treated Wicksell's work, which he acknowledges in Chapter 4 of the *Purchasing Power of Money.* And Wicksell himself gave his readers many reasons to interpret him along these lines. See Laidler (1991) Ch. 5. The main theme of Boianovsky (2011) is of course the parallel development of Fisherian and Wicksellian monetary economics, and their divergence, in subsequent years.
[35] This is one of the major themes explored in Laidler (1999)

name appeared only four times in the index to Friedman and Schwartz's (1963a) *Monetary History of the United States* – one time less than Edwin Kemmerer's.

Moreover, though Friedman and Schwartz did explicitly evoke Fisher's phrase "a dance of the dollar" in the introduction to their (1963b) account of "Money and the Business Cycle", it is not a little ironic that their subsequent analysis bore the hallmarks of Mitchell's National Bureau, that their account of cyclical transmission mechanisms harked back to Hawtrey by way of Cagan (1965) in stressing systematic variations in the currency-deposit and reserve-deposit ratios, and that where the sequence of Fisher's dance had gone from money growth to inflation to real variables and back to money growth, theirs put variations in nominal income at the centre of things, and showed that the breakdown of these between their real income and price level components had the former systematically in the lead.[36] Finally, to the extent that there is any pre-echo in Fisher's writings of Friedman and Schwartz's emphasis on the influence of disequilibria between supplies and demands for stocks of monetary and financial assets on expenditure flows – a feature that their work shared with that of their fellow monetarists Karl Brunner and Allan Meltzer - See (1993) for a retrospective summary - it is to be found in a single (1933) paragraph in which, as almost an aside, Fisher refers to ". . .the direct effect of lessened money, deposits, and their velocity, in curtailing trade, as evidenced by the fact that trade has been revived locally by emergency [presumably scrip] money without any raising of the price level".(1933b, p. 342, [p. 328]) But Fisher was here finally catching up to an element in the transmission mechanism that Hawtrey has been canvassing with increasing emphasis since (1913 see especially. p. 65), though he seems to have been quite unaware of this.

To find any lasting effect of its earlier encounter with Fisher on the quantity theory's monetarist life, we must consider the so-called Fisher effect.[37] First taken up by

[36] There is a puzzle here. Fisher's charts and Pigou's too – see fn. 18 above – show inflation slightly leading unemployment, quite contrary to Friedman and Schwartz's stylized facts about the timing of changes in variables over the cycle. Perhaps the difference here arises from the fact that both Fisher and Pigou use wholesale price indices dominated by commodity prices which were presumable determined in what we would, following John Hicks (1974), call flexprice markets, whereas Friedman and Schwartz are usually discussing the behaviour of national income deflators dominated by Hicksian fixprices.

[37] This is also the view of Bordo and Rockoff (2011), who's more general influence on this section of the current paper should be explicitly acknowledged. Note, however, that by the early 1970s, in the context of then ongoing debates about the role of monetary as opposed to cost-push influences in generating inflation

Fisher in (1896), and largely forgotten during the Keynesian episode, this would become the centerpiece of monetarism's explanation of why, during periods of expansionary monetary policy, nominal interest rates tended to rise, instead of fall as the prevailing orthodoxy of 1950s and 60s seemed to have it. More important, it was also explicitly invoked by Friedman in his seminal 1967 AEA presidential address (Friedman 1968), more specifically in that paper's section on "Employment as a Criterion of Policy" where he developed his "natural unemployment rate" hypothesis by introducing inflation expectations into the Phillips curve.[38] Having referred to "the Irving Fisher distinction between the nominal and the real rate of interest" as "the one wrinkle we have added" (p. 102) to Wicksell's analysis of the natural interest rate, he then warned that Phillips work contains a basic defect: "the failure to distinguish between *nominal* wages and *real* wages- just as Wicksell's analysis failed to distinguish between *nominal* interest rates and *real* interest rates. Implicitly Phillips wrote his articles for a world in which everyone anticipated that nominal prices would be stable" (p. 102)[39]

Crucial in the current context, moreover, the natural unemployment rate hypothesis immensely strengthened the essentially Fisherian case that Friedman (e.g. 1958) had long been making that monetary policy could be directed only at controlling the price level, and should be legally constrained to this task. To be sure his money growth rule was not a price level rule, but his choice here rested on technical judgments about what was feasible, not on any deep theoretical reasons. "Stable Money" in Fisher's sense was also Friedman's aim, even if the immediate influence on him was Henry Simons. It is thus hard to resist the conclusion that the quantity theory's involvement with Monetarism's version of stable money was a direct legacy of its earlier encounter with Fisher.

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in the United States, Friedman was paying more attention to Fisher the quantity theorist, as Dimand (2011), citing Friedman (1972), points out.

[38] As noted earlier, Fisher knew that the distinction between real and nominal interest rates appeared in Marshall's work, as indeed did the vocabulary itself. Even so, the much greater clarity with which Fisher (1896) brought to bear on the role of expectations as opposed to realizations of inflation in this context entitles him to the credit that Friedman gives him here.

[39] Wicksell was not, of course, quite as innocent of this distinction as Friedman suggested – See Laidler (1991, pp. 134-5) and especially Boianovsky (2011)

Concluding Comment: The Quantity Theory in Limbo

At the time of writing, the quantity theory is yet again in limbo. Its most recent demise had two causes, each a new manifestation of an old weakness. First, money growth targeting, a practical, but diluted, application of Friedman's policy proposals, did not work well, and this happened in some measure because its adoption provoked institutional adaptations that then undermined it. This should not have come as a surprise to anyone aware of what the consequences of the 1844 Bank Charter had been for the quantity theory's reputation in an earlier era, but evidently it did. Second, the New-classical money-supply surprise model of the cycle - a still quantity-theory-based successor to Friedman and Schwartz's monetarist approach - reformulated the expectations-augmented Phillips curve as an aggregate supply curve and hence reverted to Fisher's (1911, 1923, 1925 and 1926) hypothesis that price level fluctuations led those in real variables in the transmission mechanism of monetary impulses. It thus set itself up for gross empirical failure when faced with the basic facts of the timing of the real and nominal responses to monetary impulses that Friedman and Schwartz, among others, had so thoroughly documented in the meanwhile.[40]

Given these two failures, it was not surprising that most macroeconomists would soon discard the quantity theory and succumb to real business cycle theory and New-Keynesian economics, neither of which leaves any significant space for money to play a role in the economy, The goal of stable money, in the guise of inflation targets, nevertheless survived the quantity theory's disappearance for a while, only to be threatened by yet another repetition of history, namely the apparent failure before 2008, as before 1929, of the price level to give a clear warning about the approach of a major economic crisis. Whether all this means that the quantity theory is finally dead, or only that it has gone into hiding prior to beginning yet another of its nine times ninety lives, remains to be seen.Historians of economics will be inclined to bet on the latter possibility, and therefore continue to take an interest in this doctrine's earlier incarnations, not least the one which Irving Fisher did so much to shape.

[40] But see, nevertheless, fn.36, above.

Appendix A. Letter from Professor Irving Fisher to an Unknown Recipient

The following is the text of a typed letter attached to an offprint from *Econometrica* of Fisher (1933) that is held in the D. B, Weldon Library at the University of Western Ontario. The letter is on what appears to be Fisher's personal notepaper, bearing the printed heading

Professor Irving Fisher
460 Prospect Street
New Haven, Connecticut

It is dated, simply, November, 1933. Though bearing what appears to be Fisher's hand written signature, the letter itself reads as if it were a circular sent out to many recipients. There is nothing to indicate who, among the very small number of economists at that time located at the University of Western Ontario might have received Fisher's offprint. My colleague Jim Davies suggests that the most likely recipient was the then head of the Department of Economics and Political Science, Harold Logan, a labour economist who had done graduate work at Chicago, or perhaps his eventual successor in that position, Mark Inman, a then recently appointed Ph.D.from Harvard. But the fact that anyone connected to what was then a small regional university did so suggests that Fisher distributed it rather widely. The text follows.

My dear Sir: [sic]

I am sending you a reprint of my article in the October number of "Econometrica" on the "Debt-Deflation Theory of Great Depressions".

If my chief contention is correct, namely that the main secret of great depressions usually lies in the fact that the effort to reduce debt really increases it [underlining in original] under certain circumstances and tends to produce the many consequences noted in the article (and elaborated in "Booms and Depressions"), and if the "debt-deflation theory" is "both new and important", I am naturally anxious that this reprint shall reach all serious students of so-called cycle theory.

I did not try, in "Booms and Depressions" itself, to make any specific claims but merely made a very general statement in the preface. This was partly because of my unfamiliarity with the literature (although thus far no one has found the theory definitely anticipated). Moreover the book was written for immediate usefulness and I feared that, if I emphasized the newness of the theory, I might excite distrust in the lay reader.

But now that the theory is being widely accepted, I fear it may not be traced to the proper source and that my book may be regarded merely as a popularization of previously accepted conclusions.

I would be grateful if you can supply me with any additional names of "cycle" students and still more if you can indicate any anticipations of this theory other than the few partial anticipations noted in the article.

Very sincerely,

Irving Fisher

Enc

References

Angell, J. W. (1936), *The Behaviour of Money* New York; McGraw Hill

Arnon, A. (2011), *Monetary Theory and Policy from Hume and Smith to Wicksell*, Cambridge; Cambridge University Press

Barber, W. J. (1985), *From new era to New Deal: Herbert Hoover, the economists and American economic policy, 1921-1933,* Cambridge, Cambridge University Press

---------- (ed.), with R. Dimand and K. Foster. (1997) *The Works of Irving Fisher Vols. 1 – 14,* London; Pickering and Chatto

Baumol, W. J. (1952) The demand for money, an inventory theoretic approach *Quarterly Journal of Economics* 66, (Nov.) 545-556

Boianovsky, M. (2011) Fisher and Wicksell on money: a reconstructed conversation, (paper presented at this conference) Universidade de Brasilia (mimeo)

Bordo M. D. and H. Rockoff (2011) The influence of Irving Fisher on Milton Friedman's monetary economics, NBER working paper #17267

Brunner K. and Meltzer A. H. (1993), *Money and the Economy: Issues in Monetary Analysis* Cambridge; Cambridge University Press, for the Raffaele Mattioli Foundation

Cagan, P., (1965) *Determinants and Effects of Changes in the Stock of Money, 1875-1960,* New York; NBER

Cassel, G. (1928) The rate of interest, the bank rate and the stabilization of prices, *Quarterly Journal of Economics* 42 (Aug.) 511-529

Currie, L. (1934), *The Supply and Control of Money in the United States,* Cambridge Mass.; Harvard University Press

Davidson, D. (1913) Irving Fisher's proposal to regulate the purchasing power of money (published in Swedish) *Ekonomisk Tidskrift* 15: 87-107

De Boyer des Roches, J and R. Gomez Betancourt (2011) Origins and developments of Irving Fisher's Compensated Dollar plan, (paper presented at this conference) (mimeo)

Dimand, R. (2003a), Irving Fisher's rejection of the so-called business cycle *History of Economic Ideas* 11 (1) 129-150

---------- (2003b), Competing visions for the U.S. monetary system 1907-1913: the quest for an elastic currency and the rejection of Irving Fisher's compensated dollar scheme *Cahiers d'economie politique* 45 (Nov.) 101-121

---------- (2011) One hundred years from today: Irving Fisher's *The Purchasing Power of Money History of Economics Review* No. 54 (summer) 131-143

Dow, J. C. R. (1964), *The Management of the British Economy 1945-1960* Cambridge; Cambridge University Press

Fisher I.,(1892) *Mathematical Investigations in the Theory of Value and Prices,* Transactions of the Connecticut Academy, IX (July) as repr. in Barber et al. Vol. 1

--------- (1894) The mechanics of bimetallism *Economic Journal* 4 (Sept.), 527-537, as repr. in Barber et al. Vol 1.

--------- (1896) *Appreciation and Interest AEA Publications* 3 (11) (Aug.) 331-442, as repr. in Barber et al. Vol. 1

---------- with H. G. Brown (1911) *The Purchasing Power of Money,* New York; Macmillan (2nd ed. 1913) as repr. in Barber et al, Vol 4

---------- (1914) Objections to a compensated dollar answered *American Economic Review* 14, supplement 2, (Dec.) 819-839, as repr. in Barber et al. Vol. 4

---------- (1920) *Stabilizing the Dollar* New York; Macmillan, as repr. in Barber et al. Vol. 6

---------- (1922) *The Making of Index Numbers* Boston and New York; Houghton Mifflin Company. (3rd. ed, 1927) as repr. in Barber et al, Vol. 7

---------- (1923) The business cycle: largely a dance of the dollar, *Journal of the American Statistical Association* 18 (Dec) 1024-1028,.as repr. in Barber et al. Vol. 8 .

----------(1925) Our unstable dollar and the so-called business cycle, *Journal of the American Statistical Association,* XX, (June) 179-202, as repr. in Barber et al. Vol. 8

---------- (1926) A statistical relation between unemployment and price changes, *International Labour Review* XIII (June) 785-792 as repr. in Barber et al. Vol. 8, See also: Fisher (1973) I discovered the Phillips Curve: a statistical relation between unemployment and price changes by Irving Fisher, *Journal of Political Economy* 81 (2) , 496-502

---------- (1928) *The Money Illusion* New York; Adelphi Company, as repr. in Barber et al, Vol 8

---------- (1929) Transcript of a speech delivered at a meeting of the District of Columbia Bankers Association, 23 October, Barber et. al. Vol 10

---------- (1930) *The Stock Market Crash – and After,* New York, Macmillan

---------- (1932) *Booms and Depressions* New York; Adelphi Company, as repr. in Barber et al, Vol. 10

---------- with H. R.L. Cohrssen and H. W. Fisher (1933a) *Stamp Scrip* New York; Adelphi Company

---------- (1933b) The Debt deflation theory of great depressions, *Econometrica* 1 (Oct.) 337-357,as repr. Barber et al Vol. 10

---------- (1933c) Reflation and stabilization paper read at a meeting of the American Academy of Political and Social Science on "Monetary Policy in the United States" November 22, as repr. Barber et al. Vol. 10.

---------- with H. R. L. Cohrssen (1934) *Stable Money: A History of the Movement,* New York, Adelphi

---------- (1935) *100% Money* New Haven; City Printing Company as repr. in Barber et al. Vol. 11

Friedman, M. (1956) The quantity theory of money, a restatement, in M. Friedman (ed.) *Studies in the Quantity Theory of Money,* Chicago; University of Chicago Press

---------- (1958) *A Program for Monetary Stability,* New York; Fordham University Press

---------- (1968) The role of monetary policy, *American Economic Review* 68 (March) 1-18

---------- (1972) Have monetary policies failed? *American Economic Review* 72 (May) *Papers and Proceedings,* 10-18

---------- (1975) *Unemployment versus Inflation? An Evaluation of the Phillips Curve,* London, IEA

---------- (1992) Bimetallism revisited, in *Money Mischief,* New York, Harcourt Brace Jovanovich

---------- and A, J. Schwartz (1963a) *A Monetary History of the United States 1867-1960,* Princeton N.J. Princeton University Press, for the NBER

---------- (1963b) Money and business cycles, *Review of Economics and Statistics* 45 (Feb) 32-64

---------- (1970) *Monetary Statistics of the United States* New York, NBER

Galbraith, J. K. (1955) *The Great Crash 1929* Cambridge Mass., The Riverside Press, Boston, Houghton Mifflin Company

Giffen, R. (1892), Fancy monetary standards *Economic Journal* 2 (Sept.) 209-238

Grice-Hutchison, M. (1978) *Early Economic* Thought *in Spain 1177-1740* London. G. Allen and Unwin

Haberler G. von (1932) Money and the business cycle in Q. Wright (ed.) *Gold and Monetary Stabilization: Lectures on the Harris Foundation,* Chicago, University of Chicago Press

Hart, A. G. (1935) The *Chicago plan* of banking reform, *Review of Economic Studies* 2. 104-116

Harvey W. H. (1894) *Coin's Financial School* Chicago, Coin Publishing Co, as repr. ed. R. Hofstadter, Cambridge Ma.; Belknap Press 1963

Hawtrey, R. G. (1913) *Good and Bad Trade* London; Constable

---------- (1919) *Currency and Credit* London; Longmans Group

---------- (1925) Public expenditure and the demand for labour, *Economica* 5 (March) 38-48

Hicks, J. R. (1974) *The Crisis in Keynesian Economics,* Oxford; Oxford University Press

Hume, D. (1952) Of Money, in *Political Discourses,* London, as repr. in *Essays Moral, Political and Literary,* Oxford; Oxford University Press 1963

Humphrey, T. M. (1984) Algebraic quantity equations before Fisher and Pigou, *FRB Richmond Economic Review* (Sept/Oct) 13-22

---------- (2002) Knut Wicksell and Gustav Cassel on the cumulative process and the price stabilizing policy rule, *FRB Richmond Economic Quarterly* (Summer) 59-83

Jevons, W. S. (1875) *Money and the Mechanism of Exchange* London,\; C. Kegan Paul and Co

Johnson H. G. (1971) The Keynesian revolution and the monetarist counter-revolution, *American Economic Review (papers and proceedings)* 61 (May) 1–14

Jonung, L (1979) Knut Wicksell's norm of price stabilization and Swedish monetary policy in the 1930s, *Journal of Monetary Economics,* 5, 85-104

Kemmerer, E. (1909) *Money and Credit Instruments in their Relation to General Prices* New York; H. Holt

Keynes, J. M. (1923) *A Tract on Monetary Reform,* London; Macmillan

---------- (1930) *A Treatise on Money, Vol. 1 The Pure Theory of Money,* London; Macmillan

---------- (1936) *The General Theory of Employment, Interest and Money,* London; Macmillan

Laidler, D. (1991) *The Golden Age of the Quantity Theory* Hemel Hemspstead; Philip Allan

---------- (1999) *Fabricating the Keynesian Revolution* Cambridge; Cambridge University Press

---------- (2004) From bimetallism to monetarism: the shifting political affiliation of the quantity theory, in Barens I, V. Caspari and B. Schefold (eds.) *Political Events and Economic Ideas* Cheltenham, Edward Elgar

Laughlin, J. L. (1885) *A History of Bimetallism in the United States,* New York; Appleton

---------- (1903) *The Principles of Money* New York; Charles Scribners and Sons

---------- (1931) *A New Exposition of Money, Credit and Prices,* Chicago; University of Chicago Press

Leijonhufvud A. (1981) The Wicksell connection, in *Information and Coordination,* Oxford; Oxford University Press

Marshall, A. (1887) Remedies for fluctuations in general prices, *Contemporary Review*, as repr. in A. C. Pigou, (ed.) *Memorials of Alfred Marshall,* London; Macmillan 1925

---------- (1895) *Principles of Economics 3rd ed.,* London; Macmillan, *5th ed.* 1907

---------- and M. P. Marshall (1879) *Economics of Industry,* London; Macmillan

Meiselman D. (ed.) (1963) *Varieties of Monetary Experience,* Chicago; University of Chicago Press

Meltzer, A. H. (2003) *A History of the Federal Reserve, Volume 1: 1913-1951* Chicago, University of Chicago Press

Minsky, H. P (1963). Comments (on Friedman and Schwartz) *Review of Economics and Statistics,* 35 (Feb.) 64-72

Mitchell W. C. (1913) *Business Cycles* Berkeley; University of California Press

---------- (1927) *Business Cycles: The Problem and its Setting* New York; NBER

---------- et al (1923) *Business Cycles and Unemployment* New York; NBER

Newcomb, S. (1885) *Principles of Political Economy,* New York; Harper & Bros.

Patinkin, D. (1969) The Chicago tradition, the quantity theory and Friedman, *Journal of Money, Credit and Banking* 1, 46-70

---------- (1974) Keynesian monetary theory and the Cambridge school, in H. G. Johnson and A. R. Nobay (eds.) *Issues in Monetary Economics* Oxford; Oxford University Press

---------- (1993) Irving Fisher and his compensated dollar plan *FRB Richmond Economic Quarterly,* (Summer) 1-33

Pigou, A. C. (1912) *Wealth and Welfare* London; Macmillan

---------- (1917) The value of money, *Quarterly Journal of Economics* 32 38-65

---------- (1926) *Industrial Fluctuations,* London; Macmillan (2nd. Ed., 1929)

Reeve, J. E. (1943) *Monetary Reform Movements: A Survey of Recent Plans and Panaceas,* Washington, D. C.; American Council on Public Affairs

Selden, R. (1956) Monetary velocity in the United States, in M. Friedman (ed.) *Studies in the Quantity Theory of Money,* Chicago, University of Chicago Press

Simons, H. (1936) Rules versus authorities in monetary policy, *Journal of Political Economy* 44 (Feb.) 1-30

Snyder, C. (1924) New measures of the equation of exchange *American Economic Review,* 14 (Dec.) 699-713

Walker, F.A (1897), *International Bimetallism* New York; H. Holt and Co.

Walras, L. (1886) *Theorie de la Monnaie*, Lausanne; Corbaz

.

Warburton C. (1966) *Depression, Inflation and Monetary Policy – Selected Papers 1945-53,* Baltimore; Johns Hopkins University Press

Wicksell, K. (1898) *Interest and Prices,* tr. R. F.Kahn, London; Macmillan (for the Royal Economic Society)

.

Williams, A (1892) A "fixed value of bullion" standard: a proposal for preventing general fluctuations in trade *Economic Journal* 2 (June) 280-289

Willis, H. P. (1932) Federal reserve policy in depression in Q. Wright (ed.) *Gold and Monetary Stabilization: Lectures on the Harris Foundation,* Chicago, University of Chicago Press

Working, H. (1923) Prices and the quantity of circulating medium, 1890-1921, *Quarterly Journal of Economics* 37 (Feb.) 228-256

Wright, Q. ed. (1932) *Gold and Monetary Stabilization: Lectures on the Harris Foundation,* Chicago, University of Chicago Press